Soil Nutrient Mass Balance Study

- Farmers and scientists are concerned that nutrient and carbon balances in Iowa's agricultural soils are on the decline.
- This study determines that soil nitrogen and carbon (organic matter) stocks in corn-soybean rotations are at significant risk of long-term decline.
- Exceptionally large soil carbon and nutrient stocks are responsible Iowa's tremendous agricultural productivity.
- If soil nutrient and carbon stocks decline, productivity (yields) will be compromised and water quality improvements will become more difficult.
- Prior to this report, no information documented the status of Iowa's soil nutrient and carbon balances; this report provides our best understanding at present.
- Nitrogen rate trials are critical to optimize nitrogen fertilizer input levels for environmental quality and agricultural productivity.
- Nitrogen rate trials are critical to confirm the findings in this report.

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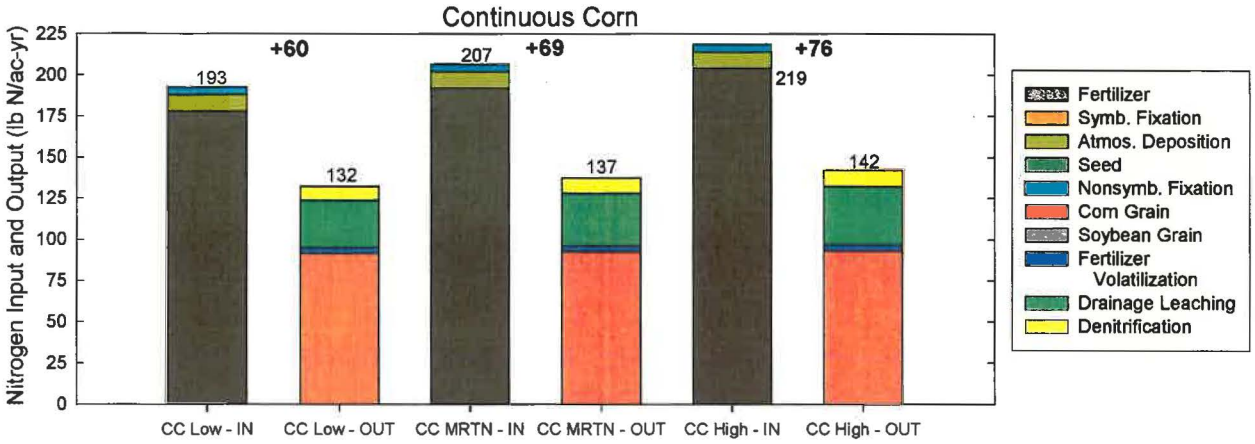
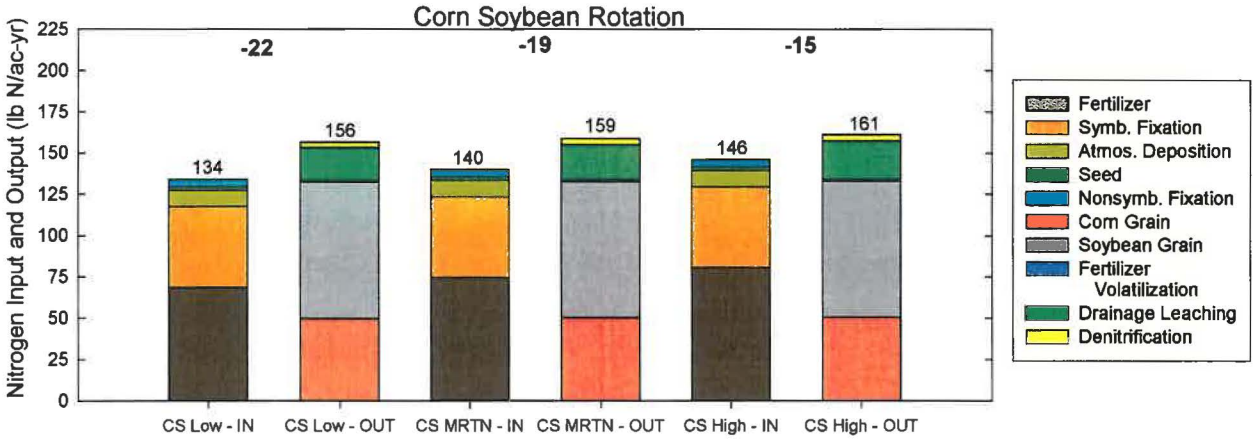
Nitrogen Balances in Iowa's corn-based cropping systems:



Above: Continuous Corn at three Nitrogen fertilizer rates: Maximum Economic Return to Nitrogen (MRTN) and a rate below MRTN (low) and above MRTN (high) that produce a profit of $-1/acre below the MRTN.



Above: Corn-Soybean rotation at three Nitrogen fertilizer rates: Maximum Economic Return to Nitrogen (MRTN) and a rate below MRTN (low) and above MRTN (high) that produce a profit of $-1/acre below the MRTN.

Right: Change in soil nitrogen and carbon stocks at a Nitrogen Rate Trial in Ames Iowa. Open circles represent corn-soybean rotation. Closed circles represent continuous corn. The dotted lines represent the Economic optimum nitrogen rate for: corn following soybeans (135lb/acre) and corn following corn (192 lb/acre). Corn-soybeans is experiencing a decline in nitrogen stocks.